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ABSTRACT

The Federal government and private corporations involved in energy production are placing great emphasis on the strip-mining of vast coal reserves. The Navajo Nation, whose lands contain 20 billion tons of low-sulphur coal, sells vast quantities of its natural resources for use in the urban centers of Arizona and southern California. However, the benefits will not be of sufficient magnitude to significantly alter the Navajo economy. Approximately $10 million will enter the Navajo economy each year from energy-related industrial activities, whereas $380 million would be needed annually to raise the Reservation standard of living to the national average. Navajos are essentially in the same economic position, in several respects, as the residents of Appalachia. The Navajo Nation, unlike the residents of Appalachia, is seen as a resource owner with contracting, law-making, and policy-making powers. However, decisions made by the Navajo Nation invariably are subject to Federal review, and this special relationship to the Federal government renders the Navajos semi-autonomous at best. This relationship sets the Navajos apart from the people of Appalachia in that the Navajos are a semi-sovereign political, legal, and social entity with expectations of full economic development. Yet, the Navajo Nation's economy continues to be severely underdeveloped in comparison to national economic averages. (Author/NQ)

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the impact of power developments on the navajo nation

LYNN A. ROBBINS

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THE IMPACT OF POWER DEVELOPMENTS ON THE NAVAJO NATION

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April 1975

LAKE POWELL RESEARCH PROJECT

The Lake Powell Research Project (formally known as Collaborative Research on Assessment of Man's Activities in the Lake Powell Region) is a consortium of university groups funded by the Division of Advanced Environmental Research and Technology in RANN (Research Applied to National Needs) in the National Science Foundation.

Researchers in the consortium bring a wide range of expertise in natural and social sciences to bear on the general problem of the effects and ramifications of water resource management in the Lake Powell region. The region currently is experiencing converging demands for water and energy resource development, preservation of nationally unique scenic features, expansion of recreation facilities, and economic growth and modernization in previously isolated rural areas.

The Project comprises interdisciplinary studies centered on the following topics: (1) level and distribution of income and wealth generated by resources development; (2) institutional framework for environmental assessment and planning; (3) institutional decision-making and resource allocation; (4) implications for federal Indian policies of accelerated economic development of the Navajo Indian Reservation; (5) impact of development on demographic structure; (6) consumptive water use in the Upper Colorado River Basin; (7) prediction of future significant changes in the Lake Powell ecosystem; (8) recreational carrying capacity and utilization of the Glen Canyon National Recreational Area; (9) impact of energy development around Lake Powell; and (10) consequences of variability in the lake level of Lake Powell.

One of the major missions of RANN projects is to communicate research results directly to user groups of the region, which include government agencies, Native American Tribes, legislative bodies, and interested civic groups. The Lake Powell Research Project Bulletins are intended to make timely research results readily accessible to user groups. The Bulletins supplement technical articles published by Project members in scholarly journals.

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ABSTRACT

This Bulletin provides the general background for a study of the impact of energy-related developments on the Navajo Nation. The growing need for energy production in the United States is described, and it is shown that the federal government and private corporations involved in energy production are placing great emphasis on the strip-mining of vast reserves of coal in order to meet this need. The coal deposits on the Navajo and Hopi Reservations play a crucial role in providing electrical energy for Arizona and southern California urban centers.

The economy of the Navajo Nation is severely underdeveloped. As of 1969, federal, state, and county funds received by Navajos exceeded total personal income. Navajo employment is confined largely to the provision of services rather than to production and commerce. In all categories the Navajo economy is underdeveloped in comparison to national economic averages for income, commerce, production, retail and wholesale businesses, education, housing, transportation, and health. The rapid increase in the Navajo population places even greater strains on the Tribal economy.

The conclusion of our study is that impacts of energy-related industries now operating on the Navajo Reservation will not substantially aid the Navajo Nation in its attempt to raise the Navajo standard of living to the national average. Approximately $10 million will enter the Navajo economy each year from energy-related industrial activities, whereas $380 million would be needed annually to raise the Reservation standard of living to the national average.

The Navajo Nation is shown to be a semi-sovereign, political, social, and economic entity which has particular goals and expectations within the framework of the larger United States society. Comparisons are made between the Navajos and the residents of Appalachia to show that while the respective economic and social positions of these two resource-rich populations are very different, their general standards of living are broadly similar. The Navajo Nation is seen as a resource owner with contracting, law-making, and policy-making powers, but it is an owner which is under the ultimate control of the federal government. Residents of Appalachia do not own natural resources and are not represented by a single unifying government, but they are not under the direct control of Congressional and Executive power.

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THE IMPACT OF POWER DEVELOPMENTS ON THE NAVAJO NATION

INTRODUCTION

The purpose of this Bulletin is to assess the impacts of recent energy-related industrial developments on the economy of the Navajo Nation. The energy needs of the United States are broadly spelled out, and the role of the Navajo Nation both in the overall energy picture and in the State of Arizona is discussed. The general information presented in this Bulletin about industrial impacts is a preface to more detailed analyses that will be published in later Bulletins of the Anthropology Subproject of the Lake Powell Research Project (LPRP).

Comparisons are made between the Navajo Nation and the residents of Appalachia to show differences and similarities in the economics of resource extraction. These comparisons show that in the national scene, the expectations of Navajos differ from the expectations of other impoverished rural dwellers from whose territories resources are extracted to supply urban centers. One of the goals of the LPRP Anthropology Subproject is an explication of the economic and political relationships between rural and urban populations in the United States. Our research shows that although Navajos are essentially in the same economic position, in several respects, as are many rural populations in the country, the Navajo Nation is a semi-sovereign legal, political, social, and economic entity which has specific goals designed to raise the standard of living of its people to the national average in overall economic development. These goals are an outgrowth of the special relationship between the Navajos and the federal government.

It can easily be shown that Navajos are impoverished in both income and general standard of living, as are many other rural populations whose regions provide vast resources for urban centers. The Navajo Nation has an anomalous legal and social position. The federal government treats the Navajo Nation both as a semi-sovereign entity with bargaining and law-making power and as a bureaucratic structure with elected officials and overall goals which serve its own people. With the exception of other reservation Indian tribes, these characteristics are not common to other rural populations in the United States.

We also examine development schemes on the Navajo Reservation in an attempt to determine whether these plans have or will have a substantial impact on the Navajo economy in view of the goals and expectations of the Navajo Nation. Some suggestions are offered as to how the Navajo Nation might more profitably benefit from energy-related developments on the Reservation.

BACKGROUND

In 1973 the United States consumed 17 million barrels of oil and 60 million cubic feet of natural gas per day. During the same year, U.S. domestic oil supplies provided 9.3 million barrels of oil per day. Even the development of Alaskan oil in full production would provide a maximum of only 10 million barrels

of domestic oil per day. By 1985, domestic supplies of natural gas will provide only about one-half of the projected demand.[1]

It is obvious that new sources of energy must be sought if the United States is to avoid unmanageable and overly burdensome dependence on foreign sources. The Office of Research and Development of the U.S. Department of the Interior has made a complete assessment of U.S. energy needs for the future. The following is one high-priority energy utilization strategy explored by this agency:

> To define a coal mining R&D [research and development] strategy, it was necessary to assess possible coal demand. To obtain an estimate of demand, the following simplified rationale was used. Energy demand was assumed to increase at a constant rate of 4.2 percent per year. Average values of energy projected to be available from other sources were then deducted from the resulting total; coal was assumed to satisfy this demand. On this basis, U.S. energy consumption will amount to 124.9×10^{15} Btu by 1985. Deducting
>
> 3.3×10^{15} Btu (hydropower)
> 18.7×10^{15} Btu (nuclear)
> 51.4×10^{15} Btu (domestic oil and gas)
> 8.4×10^{15} Btu (oil and gas imports--1970 level)
>
> leaves 43.1×10^{15} Btu to be supplied by coal. This is roughly equivalent to 2 billion tons of coal by 1985 (3.3 times 1972 production) which will require an increase of 17 percent per year in coal production and a doubling of coal production by 1980.[2]

Although this strategy is not a federal policy, it illustrates a probable growing dependence on coal in the national energy picture. With 193 billion tons of coal recoverable with present technology and within the framework of present economics, the United States will very likely use this vast resource in the near future. Of the 193 billion tons of coal, 69 billion tons are located west of the Mississippi River and much of this is accessible by strip-mining techniques.[3] Strip-mining demands less capital investment than do underground mines and for this reason the nation's private corporations involved in energy production have and will continue to emphasize strip-mining when possible. Only 3 to 5 years are required to develop surface mines, compared with 5 to 8 years for a comparable underground mine. Also, productivity from strip mines is higher. Surface mines yield an average of 40 tons per day as compared to an average of 12 tons per day for underground mining, which means lower capital cost per ton of coal mined.[4]

It is not surprising then that many coal-bearing regions of the United States are targeted for strip-mining in the near future. Earmarked for vast removal of coal are deposits in northern Wyoming, eastern Montana, the western Dakotas, northern Arizona, south-central Utah, and northwestern New Mexico. Mining operations have already begun in some of these areas. Portions of Appalachia have already been mined and there are even more ambitious plans for the future.

Navajo Coal Resources

More specifically pertinent to Navajo coal resources are the findings contained in the Southwest Energy Study published in 1972.[5] The report indicates that coal-fired electrical generation plant development in the American Southwest has been chosen as the most economical mode of energy resource utilization, considering the lag in nuclear plant development, diminishing oil and gas reserves, the vast

coal reserves in the area, and the projected energy requirements for urban centers in California, Arizona, and Nevada.[6] The Colorado basin is endowed with an estimated 100 billion tons of coal deposited in thick beds near the surface suitable for strip mining.[7] In Arizona, and located almost entirely on Navajo and Hopi Indian lands, are 980 million tons of coal with an over-burden no greater than 130 feet.[8] These coal beds are located primarily in the Black Mesa coalfields on the Navajo and Hopi Reservations.

In 1973, according to James W. Whitney, a Peabody Coal Company official, 3.2 million tons of coal were mined from Black Mesa by Peabody to fuel the Mohave Plant near Las Vegas, Nevada, and the Navajo Generating Station near Page, Arizona.[9] Mr. Whitney also stated that by 1976, the two plants will consume 13 million tons of coal annually and will produce enough electricity to meet the household needs of 3.75 million people. The total area of Black Mesa is 2 million acres, and there are an estimated 20 billion tons of low-sulphur coal beneath the surface. The Peabody Coal Company plans to mine at least 13 million tons of coal per year during a 35-year period beginning in 1976. This would involve the removal of about 455 million tons of coal. It is obvious that the Indian-owned coal at Black Mesa plays and will continue to play a crucial role in providing electric energy to the urban centers of southern California, Arizona, and Nevada.

These introductory statements set the stage for an analysis of the effects of strip-mining both on local residents (Indians and otherwise) in the mining areas and on the economy of the Navajo Nation. Utilities and mining companies represent strip-mining as a source of vast benefits to locales where mining is to be conducted. Cited as highly beneficial are increased tax income for local and state governments, coal royalties for Indian tribes, sharp increases in wages for local labor forces, road development, revenues for schools, and ancillary income for local, state, or tribal governments from leases and royalties.

On the other side of the socio-economic ledger are opposing views that local communities do not benefit and indeed are often more harmed (both economically and environmentally) than helped by strip-mining operations.

Appalachia

The following specific example illustrates this point.

Data from eastern Kentucky clearly show that benefits as originally anticipated have not been realized, despite the recent comeback of coal as a source of energy for domestic and industrial markets. Each week, more than one million tons of coal, valued at more than $4 million, are moved from eastern Kentucky to the manufacturing centers of the United States (and overseas). In spite of a 203-percent increase in production in the past 20 years (1947 through 1967), which represents an enormous outflow of local resources, employment in eastern Kentucky has fallen 65 percent because of increasing machine efficiency.[10] Coal-mining has clearly shifted from a labor-intensive to a capital-intensive enterprise.

Huge land-holding companies in Kentucky (some of which purchased coal-bearing lands as early as 1882 for as

little as 50¢ per acre) sell coal for approximately 25¢ per ton to mining companies. The profit from these coal sales is about 40 percent.[11] The economic and ecological problems faced by local governments and local residents in Appalachia are striking. For example, the Penn Virginian Corporation, which operates in Kentucky under the name of Virginia Iron and Coal Company, owns 105,000 acres of coal-bearing land, and, in 1966, sold nearly 8 million tons of coal. Net earnings for this company were $1.9 million. The company distributed $1.1 million to its stock-holders and paid $65,000 in Kentucky property taxes to Harlan and Letcher Counties, Kentucky, from which most of the wealth was generated. The company's income tax bill, due to depletion allowances and capital gains benefits, was $317,000 in the same year.[12]

The case described above is one of the many examples from Appalachia which illustrate the one-sided economic relationship between local populations and governments, on the one hand, and land-holding and mining companies, on the other. Difficulties in tax assessments of properties, huge tax benefits, low manpower needs, and environmental depredations create enormous problems for Appalachian residents. These are the same problems many residents of strip-mined and potential-strip-mine areas face. Ranchers and farmers from Montana, the Dakotas, and the Midwest are confronted with comparable problems and are mobilizing to resist a repetition of the Appalachian disasters.[13]

It has been seen that although local residents in sections of Appalachia may have been initially optimistic about the arrival of mining operations, they were ultimately disappointed and frequently bewildered by mining enterprises. Urban centers, utility, mining, and land-holding companies and their investors derive vast benefits in the form of inexpensive power and financial gain, while local residents in mined areas are impoverished both financially and environmentally. The cycle of temporary corporate energy extraction and resultant impoverishment of local communities may well befall the Navajo Nation.

In this Bulletin, we consider the question of whether major mining and utility developments on the Navajo Reservation will bring full-scale economic development to the Navajo Nation, or, as in the case of Appalachia, these power projects will be of only minor benefit if not substantial detriment. Assessments of the known or estimated impact of energy-related developments which directly affect the Navajo Nation are presented later in this Bulletin. Those developments discussed are the Four Corners Plant, Navajo Mine, Navajo Generating Station, the Black Mesa mines, the Black Mesa & Lake Powell Railroad, Black Mesa pipeline, the Mohave Plant, and related construction activities. These much-publicized projects have elicited wide public attention with regard to alleged environmental disruption and presumed threats to traditional Navajo and Hopi cultures.[14] However, the full economic impact of these enormous projects and facilities, which depend so heavily on Navajo and Hopi resources, has not been adequately assessed in the context of the general state of the Navajo economy. Investments in these projects amount to billions of dollars. For example, construction of the Navajo Generating Station near Page, Arizona, represents a cost of over $600 million.[15]

GENERAL DESCRIPTION OF NAVAJO ECONOMY AND DEMOGRAPHY

In order to assess the economic impact of the energy projects, it is necessary first to describe the major economic characteristics of the Navajo Nation and to show what is needed to bring the Navajo people to a stage of development comparable to the national average in overall economic well-being. In this Bulletin, physical environmental impacts will not be discussed. Instead, focus will be entirely on an assessment of economic impact.

Navajo Income

As of 1972, Navajo per capita income was about $900 compared with the national average of about $3,900--a gap of $3,000.[16] The gap in real dollars has steadily widened over the past two decades. For example, in 1950, the gap between Navajo per capita income and the national per capita income figure was $1,440; in 1960 it was $1,800; and in 1970 it was about $2,900.[17] Additionally, Navajo median family income in 1970 for Navajos residing in Arizona, New Mexico, and Utah (which includes most of the Navajo population) was only $3,084.[18] The reported annual median Navajo family income figure was $3,484. By comparison, Zuni Indian families averaged $6,401, and, as of 1970, the national family median income in the United States was $9,867.[19]

Furthermore, the distribution of Navajo income indicates a large substratum of very low income in the population. For example, in 1969 the upper 20 percent of Navajo earners received 54 percent of the total income, leaving the remaining 80 percent of the earners with 46 percent of the total income. The bottom 20 percent received only 2 percent of the income.[20]

Unemployment

Unemployment in the Navajo Nation is about 35 percent of the work force, or 16,567 unemployed persons of a total of 47,317 persons 16 years of age or older.[21] An additional 9,845 persons are only seasonally employed. Thus, 56 percent of the total labor force is either unemployed or seasonally employed (underemployed). The national unemployment rate in 1972 was 5.6 percent. This figure is based on records of those actively seeking employment. The two figures, although not directly comparable, nonetheless highlight a desperate economic situation in the Navajo Nation. Many economists point out that a 5- to 6-percent national unemployment rate is cause for alarm and quick action, yet the Navajo figure, regardless of differences due to recording procedures, dwarfs the national figure.

This widespread Navajo unemployment has been estimated to result in an annual net loss to the Navajo economy of $600 million.[22] The estimate is based on the assumption that if the Navajo labor force were employed on a scale comparable to the national average, wages and a subsequent "multiplier effect" would circulate $600 million in the Navajo economy each year. Furthermore, if the Navajo per capita income were brought up to the national standard, there would be a corresponding decrease in the federal, state, and county subsidies now received by the Navajo people. The multiplier effect would result in a broad tax base and a sharp reduction in welfare assistance to needy

persons. The multiplier effect would probably also permit the establishment of Navajo-owned and Navajo-operated businesses in all sectors of the economy.

Population Growth

To add to the problem of chronic unemployment, the Navajo population is growing at a rate of from 2.4 to 3.3 percent per year.[23] The 1971 population estimate for the resident Reservation Navajos was 130,000 with a possible error of plus or minus 10 percent.[24] This means that the Navajo economy must provide for from 3,120 to 4,290 additions to the population each year (at a 2.4-percent and 3.3-percent annual population increase, respectively). For comparison, the U.S. population increased an average of 1.3 percent per year from 1960 to 1970.[25] Demographically, the Navajo population is more like that of a Third World nation than that of an industrial nation. At its present rate of growth, the Navajo Nation population will more than double by the year 2000.

The implications of a rapidly growing population are far-reaching. The median age of the Navajo population was 18.4 years in 1972.[26] This compares much more closely to underdeveloped Latin American, Asian, and African nations than to the overall U.S. median age of 28.1 years.[27] The Navajo growth rate is also reflected in an average family size of 5.6 individuals,[28] as compared with the national average of 3.53.[29] Therefore, unless population growth is abated in the near future, Navajo family heads must earn even more than must the heads of average American families in order to bring Navajo families' per capita income up to the national average.

An Underdeveloped Economy

The Navajo economy has been characterized as underdeveloped,[30] and certainly the employment and demographic data presented here lend support to such an assertion. Labor, business, and other economic data further illustrate this point. For example, the Navajo labor force is approximately 36 percent of the total Navajo population, whereas, in the general U.S. population, about 60 percent is in the labor force.[31]

Because of larger families among the Navajo, there are fewer potential wage earners per capita, which magnifies the need for greater earnings among those who are eligible for work. Since only about 17,000 Navajos (35 percent of the eligible work force) are employed full-time, it is possible to understand why the Navajo per capita income is so low.[32]

According to the most recently released (1958) figures concerning sources of Navajo personal income, 68 percent was derived from wages, 10 percent from livestock and agriculture, 16 percent from welfare and retirement funds, 5 percent from mineral leases, and 1 percent from arts and crafts.[33]

Other indications of Navajo economic underdevelopment can be seen in the following statistics relating to education, health, housing, transportation, manufacturing and service businesses, and agriculture.

On the average, Navajos receive 5.3 years of education, as compared with 12.1 years received by the national population. Almost 19 percent of those Navajos 25 years of age or older have completed high

school; and of an adult population of about 33,000, only 325 individuals have completed 4 or more years of college. In addition, apparently one-half of all Navajos with college education do not reside on the Reservation.[34] The Navajo average of 5.3 years of education received is the lowest for any major tribe in the United States.[35] By comparison, the neighboring Hopis receive an average of 11.3 years of education and the Zunis receive 10.6 years.

In the area of health, the Navajos continue to experience a high rate of infant mortality (a definite indicator of medical care and nutrition)--110 percent of the national figure. And while the U.S. Public Health Service maintains six hospitals and numerous roving clinics on the Reservation, transportation, nutritional, educational, and economic factors continue to retard the improvement of health care. Navajo housing data show that only 8 percent of the Reservation dwellings have standard indoor plumbing, as compared with 82 percent of the dwellings in the rest of the United States.[36] About 40 percent of all Navajo homes have but one room each; an additional 21 percent have two rooms each. Of 3,660 houses owned by Navajo families, 3,000 are each valued at less than $5,000. The median valuation is $3,100.[37]

With regard to transportation, the Navajo Nation has only 60 miles (97 kilometers) of surfaced roads for every 1,000 miles (1,600 kilometers) of roads, whereas in the rural Southwest there are 154 miles (248 kilometers) of surfaced roads for every 1,000 miles of roads.[38]

Further evidence of the Navajo Nation's underdevelopment is reflected in the figures concerning types of employment. Only 4 percent of the Navajo labor force is employed in manufacturing concerns, while 26 percent of the national labor force is so occupied. The Navajo labor force is clearly only marginally involved in manufacturing, as Table 1 indicates. For every 100,000 Navajos, 220 are employed in commercial or service businesses, which is in sharp contrast to the national average of 1,500 for every 100,000 persons.[39]

The Navajo economic infrastructure has experienced only marginal development in the private business sector. Only 33 percent of the retail establishments on the Reservation are Navajo-owned.[40] There are only 171 retail businesses on the Reservation, whereas the surrounding counties of McKinley, San Juan, Coconino, and Navajo have between two and three times as many retail establishments (yet the Reservation has two and one-half times as many people as Coconino County, the largest of the counties surrounding the Navajo Nation). In addition, there is only one wholesale business on the Reservation.[41]

The disposition of Navajo personal income indicates that Navajo cash resources flow off the Reservation rather than remain on the Reservation to build the Reservation economy, as is shown in Table 2. Furthermore, much of the personal income spent on the Navajo Reservation goes to traders and other non-Navajo businesses. Approximately 62 percent of all the businesses on the Reservation are owned by non-Navajos.[42]

From agricultural statistics, it may be shown that income per Navajo farm is only $2,360[43] compared to the average farm income in the United States which is $14,020.[44] Navajo lands are not generally regarded as being highly productive, but

Table 1: Navajo Total Employment by Employment Sector

Employment Sector of the Economy	Percentage of Navajo Economy (by 1967 Employment)	Total Number of Navajos Employed
Government	29.3	7,287
Rangeland	34.1	8,464
Service Trades	12.1	3,011
Manufacturing and Processing	3.7	928
Commercial Trades (Including Tourism)	3.2	786
Mineral Resources	1.9	485
Forest	1.6	400
Utilities	0.8	194
Other	13.2	3,273
Total for All Sectors:	100.0	24,828

Source: Evaluation of Population Support Capacity of the Navajo Reservation, Bureau of Indian Affairs, Navajo Area Office, 1970

Table 2: Disposition of Navajo Personal Income

Where Spent	Percent of Total Income
Off-Reservation	67
On-Reservation	13
Taxes	12
Savings	3
Unaccounted for	5
	100

Source: Navajo Nation, 1972, The Navajo Ten-Year Plan, Window Rock, Arizona

in spite of ecological limitations, the Reservation farmers and stockmen could realize a much greater return on invested capital if sufficient capital were available for the acquisition of water (the Reservation has large reserves of subsurface water) and other necessities (such as feed, seed, and machinery).

Tribal Income

In addition to examining personal income, it is also necessary to consider the economic characteristics of the Navajo Nation as a semi-sovereign political and economic entity. The general state of the economy of the Navajo government is a reflection of the prevailing economic conditions found in the personal income sector of the Navajo Nation.

The Navajo Nation has about $54 million in capital reserves, as reported by Tribal officials during the 1973 Civil Rights Commission hearings held in Window Rock, Arizona. This sum is used to maintain the Tribal government, to provide educational assistance, and to assist needy families with the purchase of clothing for school-age children. Oil, gas, and coal leases bring the largest amounts of money into the Tribal treasury. In 1972, Tribal earnings from revenue-producing enterprises were approximately $17 million, $8 million (47 percent) of which were derived from oil and gas leases. Almost $2 million in net profits were received from Tribally owned timber operations, which are the only Navajo-owned and Navajo-operated businesses of substantial magnitude on the Reservation. Except for coal, the Reservation mineral resources (such as oil and gas) are fast being depleted, and revenues from the sale of these resources have dwindled from a high income figure of $34 million in 1957 to $8 million in 1969.[45]

As indicated above, nearly 30 percent of the jobs held by on-Reservation Navajos originate with the federal government, and federal sources of revenue for general maintenance are also high. In 1969, approximately $114.4 million in the form of federal, state, and county revenues (largely federal) entered the Reservation economy for the operation of educational, health, and transportation services, and for salaries of public employees (many of whom were not Navajos). This sum amounted to about $950 per capita for Reservation Navajos and it *exceeded* the 1969 per capita income ($831) by about $119. In 1969, the Tribal government received $13.6 million from investments and other sources, public assistance funds amounted to $114.4 million, and personal income totalled only $97 million.[46]

The Navajo Nation would surely prefer economic conditions other than those we have described here. In response to a vital need for greater economic self-sufficiency, staff members of the Tribal government prepared The Navajo Ten-Year Plan which sets down the general conditions of the economy and the future needs of the Navajo people. The Navajo Ten-Year Plan, a report released by the Navajo Nation in 1972, concluded that $3.8 billion is needed over the next 10 years to bring the Navajo standard of living up to the national average. The plan, if fulfilled, would also bring Navajo employment up to the 90 percent level. In all, by 1982, 26,000 persons would be brought into the public sector of the economy and an

additional 20,000 would be brought into the private sector.[47]

We saw that, according to the Tribal estimates, an average of $380 million per year will be needed in all major sectors of the economy to bring the Navajo standard of living up to the national average. This sum exceeds present Navajo personal income by more than 350 percent and is 22 times the Tribal government's 1972 income. Figure 1 is a breakdown of Navajo sources of income (personal and otherwise) for 1969. The breakdown of income sources and the dollar amounts shown indicate a need for large increases in revenues in the personal and Tribal sectors of the economy, the very need clearly recognized by officials of the Navajo Nation.

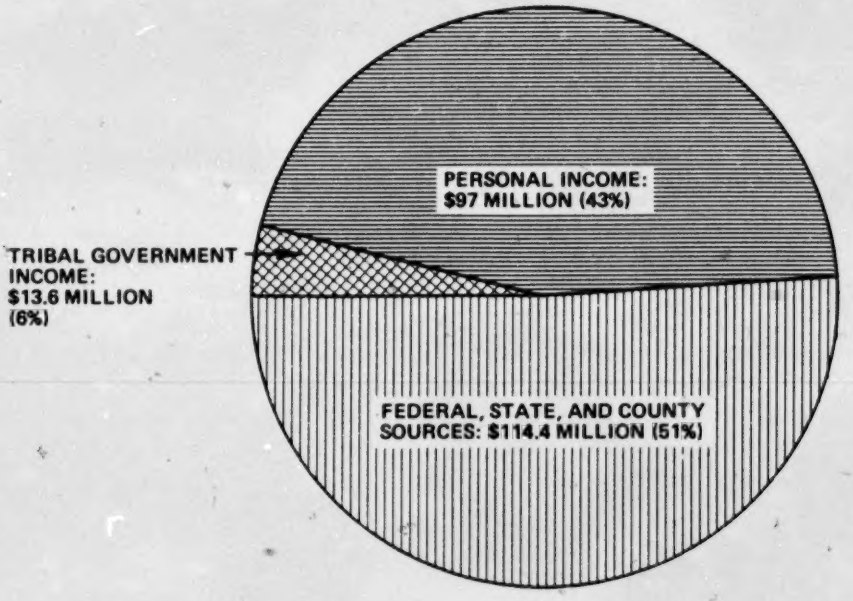

Figure 1: Personal, Tribal Government, and Public Assistance Sources of Income for the Navajo Nation, 1969[a]

[a] Data for 1969 are used in this Figure for all sources of income. Personal income in 1969 was $831 per capita. To arrive at a sum of $97 million in total personal income, we multiplied $831 by a population estimate of 120,518 for the on-Reservation population, using a figure computed by the Bureau of Indian Affairs, Office of Information and Vital Statistics, Navajo Area Office, June 1, 1969.

INDUSTRIAL IMPACTS ON THE NAVAJO ECONOMY

We now turn to the impact of industrial energy developments on the Navajo economy. Again we ask whether these developments will substantially aid the Navajo people and their government in their desire to gain an economic status comparable to that enjoyed by the general population of the United States.

As of May 1974, 537 Navajos were employed at the Navajo Generating Station by the Bechtel Corporation and by the Salt River Project; an additional 59 Navajos were employed by subcontractors. As of June 1974, the two operating mines on Black Mesa (Black Mesa Mine #1 and the Kayenta Mine #0252) employed a total of 189 Navajos. The Four Corners Plant employed 128 Navajos as of June 1974, and the Utah International Mine, which supplies coal to the Four Corners Plant, employed about 180 Navajos.[48] Approximately 30 Navajos work on the Black Mesa & Lake Powell Railroad, and approximately 20 Navajos are employed by the Black Mesa Pipeline Company. An additional 1,143 Navajos are employed in the energy industries (their average annual individual income is about $11,000, or an estimated total of $12.5 million). However, it is expected that this total will decline by about 50 percent when construction of the Navajo Generating Station is completed in 1976. It has been estimated that over the Station's projected 35-year period of operation, the associated industrial energy projects will steadily employ about 500 Navajos. This employment figure will result in a total annual payroll of about $5.5 million, discounting inflationary trends and expansion of plant facilities and mining activities.

Tribal income is similar in total amount to wages. After 1976, leases, royalties, and right-of-way payments will bring about $4.5 million per year into the Tribal treasury.[49] However, coal leases contain a stipulation that there will be a graduated percentage increase in royalty payments as the price of coal received by the Peabody Coal Company from utility companies reaches or exceeds $4.00 per ton. Presently the Navajo Nation receives 20¢ per ton of coal for coal mined from the 1934 Boundary Bill Reservation for the Navajo Generation Station, and it receives 12-1/2¢ per ton of coal mined from the 1882 Joint Use Reservation for the Navajo Generating Station. The Hopis also receive 12-1/2¢ for coal mined from the 1882 Joint Use Reservation. When the price of coal per ton reaches $4.00 (but does not exceed $5.00), royalty payments for coal from the 1934 Boundary Bill Reservation are to increase from 25¢ to 30¢ per ton. Coal leases are also renegotiable every 10 years, which will allow Navajo and company negotiators to make inflationary adjustments in royalty payments in the future.

Another source of Tribal income is revenue from water pumped (at a rate of 2,000 to 2,400 gallons per minute) from deep wells at Black Mesa. This water is used to operate the Black Mesa Pipeline which transports coal by slurry to the Mohave Generating Station. The amount involved is about 3,100 acre-feet of subsurface water, which is sold for $5.00 per acre-foot by the Navajos and $1.67 per acre-foot by the Hopis. The revenues received from this source will bring the Navajo Nation approximately $9,000 each

year. Over the course of 35 years, 37 billion gallons (127,750 acre-feet) of water will be taken from Black Mesa. The Navajo Nation will receive approximately $315,000 for its share of water revenues (again discounting possible price adjustments in the future). The Navajo Nation also has agreed to transfer its consumptive rights to 34,100 acre-feet of water from Lake Powell in order to provide the Generating Station with sufficient water for its operation. Based on present projected figures, the total revenues accruing to the Navajo Nation and the Hopi Tribe from coal sales at Black Mesa will be about $100 million over a 35-year period. The Navajo Nation is to receive approximately 76 percent of this sum. The Peabody Coal Company is to receive approximately $750 million over the same period of time.[50]

During the first 25 years of the coal operation, the Navajo Nation will receive payments of $169,000 annually for the Navajo Generating Station site (1,021 acres); an ash disposal area (765 acres), a rail loading site (100 acres), and a one-acre pumping plant site. The lease also allows a second 25-year period of use which will be subject to price increases, based on increases in the Consumer Price Index. The Navajos also will receive payments of $125,000 per year for transmission line rights-of-way. A right-of-way contract with the Black Mesa & Lake Powell Railroad will yield payments of about $108,000 annually for the first 25 years of plant operation. These three contracts combined assure total payments of $402,000 annually to the Navajo Nation. The remaining direct financial payments to the Tribe consist of contributions by the Salt River Project of $25,000 per year for a period of 5 years (beginning in 1969) for a professional chair at Navajo Community College in Tsaile, Arizona, and a one-time $250,000 donation to the College made in 1969 by the participating companies of the Navajo Generating Station Project.

Taxes provide additional benefits to the Navajos. In 1973 the Peabody Coal Company paid $662,000 in property taxes to Navajo County for its Black Mesa Mine #1. Company officials expect this figure to double in 1974 when property taxes are assessed on a recently opened second mine (Kayenta #0252). In 1974, the Black Mesa Pipeline Company paid approximately $1.5 million in property taxes to four Arizona counties (Coconino, Mohave, Navajo, and Yavapai). Nearly one-third of this sum went to Kayenta School District #27 where many Navajo children attend school. In 1973, Peabody Coal also paid $350,000 in sales taxes to the State of Arizona. A portion of that amount is returned to the Navajo people in the form of State services. Taxation on operation (utilities sales, property taxes, etc.) at the Navajo Generating Station is expected to yield about $10.5 million annually to the State of Arizona.[51] The tax payments expected to result from the operation of Navajo Generating Station have caused concern among some members of the Navajo Tribal Council, because the State of Arizona will realize greater benefits from the Station's operation alone than the Navajo Nation will receive from total coal royalties, wages, and land leases.[51]

The State of Arizona recently reported that State taxes collected from Indians residing on reservations in the State were $9.6 million, while the State paid $11.1 million in services. More than 80 percent of the total amount paid by the State went for Indian education, while the major portion of the balance (approximately 20 percent) was paid out in

welfare.[52] The State's figures have been sharply criticized on the grounds that, among other alleged shortcomings, they failed to distinguish between reservation and non-reservation Indians in Arizona. Furthermore, the State neglected to point out that it also receives large revenues from the operation of the Navajo Generating Station, the Black Mesa Mines, the the Black Mesa & Lake Powell Railroad, and the Black Mesa Pipeline Company, all of which, as noted above, depend on Indian resources. We also note that according to the provisions of the Johnson-O'Malley Act, local school districts receive funds on a matching basis from the federal government for enrolled Indian school children.

Other industrial benefits realized by the Navajos include the Peabody Coal Company making coal from its Black Mesa mines available to local families at the mines, and the Black Mesa Pipeline Company providing water from its wells to local residents.

Over a 35-year period, the Peabody Coal Company's operations at Black Mesa will involve stripping approximately 14,000 acres of land, although more than 64,000 acres, about 100 square miles (256 square kilometers), of land have been leased. Mineral leases run 99 years. In all, 53 Navajo families are scheduled to be relocated as a result of currently planned mining activities. Those families who are to be relocated have been or will be financially compensated for the loss of their homes due to the mining operations. Some families have contested this action and are presently considering filing a suit against the Navajo Nation to contest the legal right of the Tribal government to force them to move without their prior consent.[53] Also, there have been complaints registered by some of our Navajo informants in the Page, Arizona, area that Black Mesa & Lake Powell Railroad has cut through their native grazing land.

Another benefit to the Navajos was the construction and subsequent operation of Glen Canyon Dam (the Lake Powell impoundment). This massive project in the late 1950s and early 1960s, which cost hundreds of millions of dollars, employed approximately 100 Navajos in a peak work force of 690 in January 1962, according to a labor union official in Flagstaff, Arizona.[54] As with all construction projects, however, completion of Glen Canyon Dam left the 100 or so Navajos to seek work elsewhere, and we expect that this same boom and/or bust fluctuation in the Navajo economy will occur when the Navajo Generating Station is completed.

Maintenance and operation of Glen Canyon Dam requires a relatively small number of people. As of September 1971, six Navajos were employed there by the Bureau of Reclamation, according to the Bureau's employment records.

A final and perhaps crucial benefit to the Tribe from current projects is the unionization of Navajo workers at the industrial energy projects. As never before, Navajos have become members of a wide variety of national and international labor organizations. Navajo workers' expectations (including increased wages, fringe benefits, ability to organize, and job training) have greatly increased due to their participation in unions. These changes in worker expectations could have

a profound effect on worker-industry relations.

Accounting for all sources of revenue for the Navajo Nation (Tribal income only), the annual revenues will amount to about $4.5 million by 1976. Combined with wages ($5.5 million), the total revenue of the Navajo Nation will bring the Navajo economy an annual sum of about $10 million.[55]

From previous discussion, it is seen that the total dollar input into the Navajo Nation's economy (personal and government income combined) will barely scratch the surface of Navajo poverty. An estimated $380 million each year are needed over the next 10 years to bring the income of Navajos on the Reservation up to the national average income figure. At the present rate of population increase, more than four times the number of potential wage-earners are added to the work force each year than will be employed at the industrial energy projects over the projected 35-year operation period.

Those Navajos who work at the industrial energy projects will be, and indeed are, part of the upper-income bracket of wage-earners in the Navajo economy. The remainder of the Navajo work force will be compelled to seek employment elsewhere. Furthermore, the Navajo Nation as a government will not realize substantial revenues for its operations, certainly nothing comparable in real dollar value to the approximately $30 million per year received by the Tribe from oil and gas royalties in the late 1950s and early 1960s, a time when there were about 20 percent fewer on-Reservation Navajos than there are at present. Furthermore, the energy-related developments discussed in this Bulletin will not develop a Navajo economic infrastructure which can function independent of a single resource. The goal of independence cannot be achieved from the operation of the energy developments analyzed here as they now function in the Navajo economy.

It is conceivable that future energy development plans might substantially aid the Navajo economy. Presently, preliminary plans are underway to construct seven coal gasification plants in the Four Corners area south of the Four Corners Plant. If these projects are undertaken, they would create (albeit temporarily) thousands of construction jobs and hundreds of maintenance positions for Navajos. Coal royalties would bring additional millions of dollars into the Tribal treasury. The Navajo Nation and the major corporations involved (El Paso Natural Gas and the Western Gasification Company) cannot as yet specifically measure the possible economic impact of these developments. There are also proposals for one or two new towns in the Burnham District in New Mexico, south of the Four Corners on the Navajo Reservation. These towns would serve the new energy developments. The creation of the town or towns to accommodate workers and those involved in secondary economic activities presents enormous challenges to the Navajo Nation.

Another possible major energy development would be the mining of uranium on the Navajo Reservation in the vicinity of Shiprock, New Mexico. The Navajo Nation has entered into a uranium exploration agreement with the Exxon Corporation, for an initial sum of $6 million, and if

large deposits of uranium are discovered on the Reservation, the Navajo Nation could receive as much as $100 million in royalties.[56] No announcement has been made as to the period of time during which the possible $100 million would be paid. This agreement between the Navajo Nation and the Exxon Corporation is one of the few (if not the only) instances in which the Navajos have independently entered into a contract with a major corporation without full approval of the BIA. The Navajo Nation has threatened suit against the BIA for not acting promptly in approving the agreement. Such a threat is also a rarity in Indian-BIA relations.[56]

Elsewhere in the United States, there are analogous cases which illustrate growing American Indian awareness in the arena of energy developments. The Northern Cheyenne Tribe in eastern Montana recently filed a legal memorandum with the Department of the Interior charging that the Tribe was not adequately informed of the growing value of coal as an important resource in the national energy picture prior to the preparation of mining permits and leases. The Tribe also claimed that the U.S. Geological Survey failed to prepare an adequate environmental impact study concerning the removal of coal from 60 percent of the Reservation, as proposed in the mining permits and leases. This action marks the first time American Indians have made a serious effort to void existing strip-mining contracts with major coal companies. The companies involved in the contracts are the Peabody Coal Company, the Consolidated Coal Company of Pittsburgh (the two largest strip-mining companies in the United States), American Metal Climax, and Chevron Oil.[57]

UNDERDEVELOPMENT AND RESOURCE EXTRACTION: APPALACHIANS AND NAVAJOS

Many authors have carefully documented the political and economic effects of underground mining and strip-mining on the local residents, municipalities, and counties in sections of Appalachia,[58] and we have already noted a case in point in an earlier section of this Bulletin. These authors have shown that local populations were only minimally involved in the flow and consumption of local resources. Neither coal nor the mining facilities were owned by the local populations. Taxation of mining operations was, and continues to be, meager, leaving counties and small municipalities to seek funds elsewhere for schools, roads, and other public services. Unemployment rates remain high in many regions, and out-migration is extensive.[59] Appalachian environmental problems resulting from underground mining and strip-mining are notorious.[60]

Unlike the Navajo Nation, the residents of Appalachia did not and do not realize royalty payments or income from land leases or rights-of-way for rail lines, roads, or transmission lines. Furthermore, people in Appalachia who live in areas which are to be mined do not have the power to enter into contracts as recognized contracting entities, whereas the Navajo Tribe has this power. The resources of Appalachia are extracted in a climate of federal compliance with mining and land-holding corporations, and, unlike the Navajos, the people of Appalachia are not overseen by federal agencies, such as the Department of the Interior and the Bureau of Indian Affairs.

Yet the residents of Appalachia and the Navajos have much in common. Neither population plays a dominant role in deciding how and whether coal will be extracted from the land they occupy. Neither population will have substantial sources of income (at least in the forseeable future) when coal mining in their homelands comes to a halt.

According to regional averages, the people of Appalachia have a substantially larger per capita income than do the Navajos: $2,698 compared to about $900.[61] However, the residents of Appalachia do not receive federal subsidies (to which the Navajos are fully entitled on the basis of treaty agreements) on a scale realized by the Navajo Nation. As was indicated earlier in this Bulletin, federal subsidies, if included in Navajo personal income, would raise the Navajo per capita income to a figure closer to that for the people of Appalachia.

The process of extracting resources from rural regions for the benefit and enrichment of metropolitan centers and large financial and industrial entities is a common feature in the economic life of the United States. The link between those who have power and gain access to resources and those who do not have power and are thwarted from gaining access to resources has been aptly labelled a "metropolis-satellite relationship."[62] Jorgensen, in altering the model developed by Baran[63] and Frank,[64] has shown that the metropolis-satellite political economy applies most appropriately to reservation Indian underdevelopment as well as to underdevelopment in Appalachia. As Jorgensen has written,

> In brief, the metropolis and satellite are two sides of the same coin, and they are both nexus and locus. The metropolis is nexus in that it is the center of concentration of economic and political power and influence. The satellite, too, is nexus, but it is the periphery to the center. The satellite provides resources and labor for the metropolis, and consumes the goods that are owned and produced by the metropolis, but does not share proportionately in the surpluses from its own area, nor does it concentrate political and economic power. The metropolis is also locus, as is the satellite. By and large the metropolises are cities or urban areas, whereas the satellites are rural towns and rural areas.[65]

Jorgensen further elaborated the metropolis-satellite relationship by noting that the center of political and economic power is not to be confused with population concentration or dispersal. Industrial and banking corporations (the metropolis), through financial, political, and technological advantages as well as manpower exploitation, continue to grow at the expense of the satellite.

> Fewer and fewer man-hours are required to produce more and more goods on greater amounts of land or from greater areas within mines. The metropolis-satellite economy is a single, integrated structure, therefore, in which the former grows at the expense of the latter.[66]

As the data presented in this Bulletin indicate, this process or relationship applies both to the Navajos and to the people of Appalachia.

Jorgensen carried his analysis one step further by showing that reservation Indians are different from all other American citizens in that they are subject to more formal political domination than any other group. He stated,

> Reservation Indians are not only subject to local, state, and federal government, but they are also the subjects of tribal governments chartered by Congress under the Indian Reorganization Act, the Bureau of Indian Affairs (a federal bureau

commissioned to administer Indian land and resources, among other things), the House Committee on Interior and Insular Affairs (which appropriates budgets for the Bureau of Indian Affairs and approves the expenditures of tribal funds), and the Secretary of the Interior (the ultimate decisions on Indian Affairs, internal and external, can be made by the Secretary).[67]

There are ways the people of Appalachia and the Navajo Nation can develop local economies. Aberle[68] presented a very careful explication of actions the Navajo Nation and federal agencies could take in order to develop the economy of the Navajo Reservation. Similarly, the Navajo Nation, in its Ten-Year Plan, has advanced a series of fiscal and economic measures to remedy economic problems. Neither Aberle's nor the Navajo Nation's recommendations will be presented in detail in this Bulletin, but some of them are identical to our suggestions.

One of the most obvious ways to develop the Navajo and Appalachian economies would be to redirect capital back into the rural zones from which many critical national resources (such as water, minerals, timber, and manpower) are taken. Higher utility rates, higher prices for coal, and partial ownership of productive facilities (a recent measure pursued successfully by some of the Arab states and other Third World nations) could bring true economic development in terms of additional businesses, new extractive industries, schools, roads, and hospitals.

In addition to encouraging the future developments already mentioned, the Navajo Nation has already taken other steps to remedy severe economic underdevelopment. The Tribe recently established the Navajo Tax Commission which, under the provisions extended to tribes under the Indian Reorganization Act of 1934, can be empowered to tax industries on the Reservation. Until now, the practice has been to allow the state to tax Reservation industries. If the Tribe were able to enforce such taxation, as much as $30 million per year could be added to the Tribal treasury from the proposed coal gasification plants and agricultural developments in the Four Corners area.[69]

However, at the present time profits and resources continue to flow out of the depressed regions with a very meager return compared to the needs of the populations. If the situation does not change, both the Appalachian people and the Navajos will be forced to migrate in ever-increasing numbers to other areas of the country. Only increased welfare aid or catch-as-catch-can local economic development will keep these people at home. Such actions will partially spare the nation the ever-worsening problems of over-urbanization.

CONCLUSIONS

This Bulletin has described the demands for the exploitation of energy resources in the United States. Government policy and private industry are placing great emphasis on increased strip-mining of coal. The Navajo Nation, which has lands containing 20 billion tons of low-sulphur coal, has become immediately involved in this quest for more energy. By 1976 the Navajos and Hopis will be selling more than 13 million tons of coal annually to various mining companies. Despite the hopes and claims by some interests that energy projects on the Navajo Reservation will greatly promote economic development of the Navajo Nation, we have seen that

the benefits will not be of sufficient magnitude to alter the Navajo economy in a significant way.

More than $380 million each year for the next 10 years would be needed to bring the Navajo Nation's economy up to the national average. The data presented in this Bulletin clearly demonstrate that the Navajo economy is severely underdeveloped at present in every important category. There is a need for large development plans of a fundamental nature. Personal and Tribal income from the energy projects discussed in this Bulletin will amount to about $10 million per year, a sum far short of the $380 million per year needed by the Navajos to achieve the national standard.

We have also shown that although the Navajo Nation sells vast quantities of its natural resources (water as well as coal) for consumption in the urban centers of Arizona and southern California, it will not realize infrastructural economic development from such transactions. We have also noted that the inferior economic and political position of the Navajo Nation is similar in some essential ways to that of residents in portions of Appalachia. The Navajo Tribe, unlike the people Appalachia, is empowered (among other things) to impose taxes, enter into contracts, insist on environmental safeguards, and demand certain levels of employment in major projects. However, decisions made by the Navajo Nation invariably are subject to federal review, and this special relationship to the federal government renders the Navajos semi-autonomous at best. This relationship sets the Navajos apart from the people of Appalachia in that the Navajos are a semi-sovereign political, legal, and social entity with expectations of full economic development. These two pockets of poverty are areas rich in natural resources that are much needed by the United States. It is ironical that both populations of these resource-rich areas do not enjoy a standard of living comparable to the majority of the citizens of the United States.

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GLOSSARY

Advisory Committee Navajo Tribe established in 1947, this committee consists of 18 Tribal Councilmen selected from the 74-member Tribal Council. It performs executive functions, but is structurally an arm of the legislative branch of the Navajo government

DNA Dinebeiina Nahiilna Be Agaditahe, the Navajo Legal Services Program

Johnson-O'Malley Act a congressional act passed in 1934 which empowers the Secretary of the Interior to make contracts with federal, state and private agencies for the education, medical care, agricultural assistance, and social welfare of Indians

metropolis the concentration of economic and political power and political influence

multiplier effect the creation of revenue-producing enterprises and other economic transactions resulting from a major economic development

nexus integrated network of political and economic relationships. Frank views capitalist relationships as nexus, an interrelated network of economic transactions. Jorgensen views capitalist economies as nexus and locus, two ends of a chain of interrelationships focusing on production rather than transactions

Salt River Project an agency representing a consortium of utilities companies and the Bureau of Reclamation responsible for the construction and maintenance of the Navajo Generating Station and

	related facilities and developments
satellite	the resources and labor of the rural areas or those areas that do not concentrate political and economic power
Third World	those nations not included among the developed capitalist or developed communist nations
1882 Joint Use Reservation	the Hopi Indian Reservation which was created by executive order, and which allows use by other Indians as seen fit by the Secretary of the Interior; approximately 8,000 Navajos live in this area
1934 Boundary Bill	the Arizona Navajo Boundary Extension Act provided for the exchange of Anglo-owned land within the Arizona part of the Reservation for land selected from the public domain

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